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BRIEFER ARTICLES

IS OPHIOGLOSSUM PALMATUM ANOMALOUS?

Under the unassuming title "Notes on the morphology of *Ophioglossum* (*Cheiroglossa*) *palmatum* L.," BOWER¹ has presented a paper containing generalizations of an unexpectedly far-reaching kind. Inasmuch as many of the arguments in this paper are directed against a paragraph in a recent paper by the present writer,² it seems desirable to make a few statements calculated to clear up the situation.

BOWER's account is based on two fertile specimens obtained during a visit to Jamaica, also on a reexamination of herbarium specimens. He adheres to his previous view of the morphology of the plant,^{3, 4} namely, that the several to many fertile spikes are derived by duplication or branching of the single spike found in *O. vulgatum*, in contrast to the usual view that the spikes represent fertile lobes of the leaf. Probably the most serious objection to the latter interpretation is the fact, brought out by BOWER, that some specimens show one or more of the *distal* spikes inserted on the adaxial face of the leaf in a more or less median position, while one might expect to find them inserted marginally. Unfortunately neither of the specimens from Jamaica, and in fact no specimen which has been available for sectioning, shows this critical feature. BOWER recognizes the importance of this method of study, for in a number of his figures he represents the vascular supply of fertile spikes. I wish to point out that each of the cases so represented (figs. 17, i-ix; 19, i-v; 20, i-vii) fits in with my interpretation of the fertile spike as either a single segment of the leaf or a fused pair of segments, so I must insist that until an opportunity occurs for demonstrating the origin of the vascular supply to the upper median spikes, my interpretation stands. At the same time, I cheerfully admit the possibility of BOWER's view as an alternative theory, especially on the basis of the branching of fertile spikes, figured in 1896 for *O. pendulum* as well as *O. palmatum*. Is it

¹ Ann. Botany 25:277-298. pls. 22-24. 1911.

² The nature of the fertile spike in the Ophioglossaceae. Ann. Botany 24: 1-18. pls. 1, 2. 1910.

³ Studies in the morphology of spore-producing members. II. Ophioglossaceae. London. 1896.

⁴ The origin of a land flora. London. 1908.

not possible, as has turned out in so many other cases, that the truth lies between the two extreme views? May it not be that the spikes of *O. palmatum* represent lobes of the leaf, and that certain of the upper ones in strong growing plants have suffered splitting or duplication? Such a view would take into account the effects of the peculiar life habits of this species, and at the same time would explain the identity in origin of the lower spikes with that found in the other members of the genus.

In his recent paper BOWER supports his interpretation by eight considerations, two of which are referred to above. Under one heading he urges the fact that "the identity of the margins of the leaf, so far as these are defined by the vascular strands, is entirely merged by the repeated fusions of the strands on the adaxial face of the elongated petiole" (p. 289). Yet, while describing the insertion of the petiolar strands on the central cylinder of the stem, BOWER shows that the leaf gap is obscured by a vascular commissure stretching across the gap at the point of attachment of the leaf trace bundles, and this fact does not cause a doubt as to the existence of a leaf gap. Apparently the anastomosing of vascular strands is characteristic of the plant, and the relationships of the parts can be best interpreted by comparison with simpler members of the family; this is what I have sought to do.

Professor BOWER's caustic remarks concerning my paper on the Ophioglossaceae may the more readily be passed over in view of the fact that he has expressly repudiated his former view as to the relationships of the group, and hence accepts the main contention of my paper. With the candor characteristic of a true scientist, he has considered the evidence accumulated since 1896, and decides that the balance is in favor of allying the Ophioglossaceae with Filicales rather than with Lycopodiales. As a consequence of this, he regards the fertile spike not as a sporangiophore, but as one or more pinnae, here again agreeing with my conclusions. If now it is admitted that the fertile spike in most members of the group represents one pinna or a fused pair of pinnae, it is difficult for me to see why the interpretation should not be pushed to its logical end. The pinna nature of the fertile spike is most clearly seen in *Botrychium*; if the spike of *O. vulgatum* or *O. reticulatum* has a vascular supply which originates in a way similar to that of species of *Botrychium*, it may be regarded as representing two fused basal lobes of the leaf. The spike of *O. pendulum* has a similar vascular supply and may also be regarded as having the same morphological nature. A basal median spike in *O. palmatum* has a vascular supply identical with this; why then should it not be interpreted in the same way?

Marginal spikes situated above this would then represent single lobes of the leaf, comparable to the abnormal spikes of *B. obliquum* figured in my paper. In fact, the new figures representing sections through the base of fertile spikes more than ever convince me that there is an underlying unity in the family, in spite of the complications shown by *O. palmatum*. This unity appears in my interpretation of the fertile spike, and forms the only basis so far offered for comparison of all the members of the group.

Just what becomes of the order Ophioglossales remains slightly in doubt, for BOWER sometimes uses this term and sometimes the term Ophioglossaceae in his recent paper. Without entering into taxonomic considerations, it would appear that Ophioglossaceae might well remain a family of Filicales.

In conclusion it may be remarked that BOWER's admirable summing up of the differences in the vascular supply of spore-producing organs among the Psilotaceae, Sphenophyllaceae, and Ophioglossaceae lends support to the view that the two great phyla Lycopsidea and Pteropsida have been separated for a vast period of time.—M. A. CHRYSLER, *University of Maine, Orono, Me.*

CRYPTOMERIA JAPONICA

(WITH FOUR FIGURES)

At the Harvard Botanic Garden, there is a *Cryptomeria japonica* 8-10 feet high. When examined early this spring, many of the branches that bore female cones were seen to have produced abnormal growths. The central axis of the cone had in some cases elongated into a vegetative branch. This condition has often been noted before in *Pinus*, *Abies*, *Larix*, *Sciadopitys*, and some other conifers, as well as in *Cryptomeria*. The *Gardeners Chronicle*⁵ in discussing proliferous cones says, "this condition is so common in our experience as to be nearly as frequently met with as the normal state." Then again in reference to *Cryptomeria*,⁶ "a very common peculiarity is the proliferation of the axis beyond the cone in the form of a slender branchlet." This vegetative proliferation has also been described by PENZIG,⁷ MASTERS,⁸ EICHLER,⁹ and others.

Another and apparently undescribed condition was observed in the

⁵ Gard. Chron., January 28, 1882, p. 112.

⁶ *Ibid.*, November 30, 1901, p. 389.

⁷ Pflanzen Teratologie, Vol. II, p. 509.

⁸ Vegetable teratology, p. 245.

⁹ Excursions morphological, Nat. Hist. Rev., April 1864.